AMENDMENTS TO THE DRAWINGS:

The attached sheet of drawings includes changes to Figures 7 and 8. This sheet, which includes Figures 7 and 8, replaces the original sheet including Figures 7 and 8. In Figures 7 and 8 the direction of the arrow connecting Receiver 1 and RX BRANCH has been corrected.

Attachment: Replacement Sheet

REMARKS

The Office Action dated May 2, 2005, has been received and carefully noted. The above amendments to the claims and the drawings, and the following remarks, are submitted as a full and complete response thereto.

Claims 12-24 are currently pending in the application, of which claims 12-15, 19-20, and 23-24 are independent claims. Claims 12-15, 19-20, and 23-24 have been amended to more particularly point out and distinctly claim the invention. No new matter has been added. Accordingly, claims 12-24 are respectfully submitted for consideration.

Objections to the Drawings

The Office Action objected to the drawings because the arrows in Figures 7 and 8 were pointing the wrong way. It is respectfully submitted that this rejection is moot in view of the replacement sheet including Figures 7 and 8 enclosed herewith.

Rejections under 35 U.S.C. 102(e)

Claims 12 and 23 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 5,883,882 of Schwartz. Applicant respectfully submits that the claims recite subject matter that is neither disclosed nor suggested in the cited art.

Claim 12 is directed to a method for testing the radio transceiver in a system where the transmission signal pass band, limited by the transmission branch filter of a duplex filter, and the reception signal pass band, limited by the reception branch filter, are adjacent so that the frequency response curves of said filters partially overlap at the stop band between the pass bands. The method includes arranging a test loop between

the transmission branch and the reception branch, wherein the test loop includes a TX coupling, a band pass filter, and a RX coupling, the test loop having essentially less attenuation on the test frequency than the duplex filter and thus a test signal proceeds via the test loop from the transmitter to the receiver. The method also includes adjusting a transmitter local oscillator of the transmitter for tuning the transmitter's transmission frequency away from the transmission signal pass band to a test frequency that falls into the stop band of the transmission branch filter frequency response curve and the reception branch filter frequency response curve. The method further includes adjusting a receiver local oscillator of the receiver for tuning the receiver reception frequency to the test frequency. The method additionally includes transmitting the test signal. The method also includes receiving the test signal which has been attenuated while passing through the test loop.

Claim 23 is directed to a radio transceiver including a transmission branch that includes a transmitter having a transmitter local oscillator tunable to a test frequency outside a transmission signal pass band. The transceiver also includes a reception branch including a receiver having a receiver local oscillator tunable to the test frequency outside a reception signal pass band. The transceiver further includes a duplex filter connected to the transmission branch and the reception branch, the duplex filter limiting the transmission signal pass band and the reception signal pass band. The transceiver additionally includes a test loop connected between the transmission branch and the reception branch and including a TX coupling, a band pass filter and a RX coupling, the

test loop causing on the test frequency an attenuation essentially lower than the attenuation caused by the duplex filter, enabling a test signal on the test frequency to proceed along the test loop from the transmitter to the receiver, and on the transmission signal pass band and the reception signal pass band an attenuation essentially higher than the attenuation caused by the duplex filter, enabling a signal on the transmission signal pass band to proceed from the transmitter to the duplex filter and on to an antenna. The radio transceiver is configured to adjust the transmitter local oscillator and the receiver local oscillator on the same test frequency and to cause the transmitter to send the test signal.

As described in the specification, certain embodiments of the present invention provide for a test procedure that not only tests the transceiver but also tests the cable connecting the transmitters and receivers to the duplex filter and the filter itself. Certain embodiments of the present invention also provide a test procedure in which the number of components in the test circuit can be as low as zero. It is respectfully submitted that the cited art of Schwartz does not teach or suggest all of the elements of any of the presently pending claims. Therefore the prior art fails to provide the critical and unobvious advantages discussed above.

Schwartz is generally directed to fault detection in a frequency duplexed system. Schwartz uses a test band located between the uplink and downlink frequency bands of a distributed, frequency duplexed network to isolate block-level faults within the network. Schwartz operates based on the non-idealities of uplink filters. In particular, Schwartz

notes that because real duplex filters do not work perfectly, the out-of-band frequency that Schwartz uses as a test signal will leak through the duplexing means into the uplink path of the remote station.

Claims 12 and 23 respectively recite, in part, "adjusting a transmitter local oscillator of the transmitter for tuning the transmitter's transmission frequency away from the transmission signal pass band to a test frequency that falls into the stop band of the transmission branch filter frequency response curve and the reception branch filter frequency response curve," and "a transmission branch including a transmitter having a transmitter local oscillator tunable to a test frequency outside a transmission signal pass band." Schwartz does not teach or suggest these elements. The Office Action asserts that these features are inherently taught. On the contrary, Schwartz teaches an opposing, contrary way of testing. Schwartz, as described above, does not teach tuning anything, but rather using a testing frequency between the uplink and downlink frequencies, and allowing an attenuated signal to enter the uplink signal path by means of the non-idealities of the duplexing means. Such an approach not only does not require tuning or adjusting a transmitter local oscillator, it obviates the motivation to do any tuning or adjusting of the transmitter local oscillator. Accordingly, Schwartz fails to teach or suggest at least these elements of claims 12 and 23.

Moreover, Schwartz explicit discloses that there are separate test signal generators 70, 84, 86, 94a, 94b, and 240 (See Figures 5a, 5b, and 9) connected to the downlink signal path. Schwartz discuss different locations for the test signal generators, but there

is no indication in Schwartz about any other means for generating a test signal. The separate test signal generators are thus an essential feature of Schwartz, and Schwartz cannot be construed to inherently disclose any other test signal generation means.

Furthermore, Schwartz discloses separate detection means 107 connected to the uplink path for detecting a test signal leaking through duplexing means in the remote station 118 (See Figure 6) or separate detection means 192, 194, 196, and 202 connected to respective downlink and uplink paths for detecting a downlink test signal and an uplink test signal that has leaked through duplexing means in the relevant remote stations (See Figure 8). In contrast, in certain embodiments of the present invention, the test signal can be received and proceed with the same receiver as other signals.

To overcome the need to know the absolute attenuation of power level of test signal throughout the network, Schwartz describes connecting the downlink and uplink signal lines with two couplers, a test band filter and an amplifier (See Figure 7a, 7b, and 7c). There is, however, no indication of changes in generating test signals in connection with Figures 7a, 7b, and 7c. Figures 7a, 7b, and 7c are presented as optional features that can be combined with the separate test signal generators and test signal detection means.

As explained above, therefore, the present invention claims "adjusting a transmitter local oscillator of the transmitter for tuning the transmitter's transmission frequency away from the transmission signal pass band to a test frequency that falls into the stop band of the transmission branch filter frequency response curve and the reception branch filter frequency response curve," and "a transmission branch including a

transmitter having a transmitter local oscillator tunable to a test frequency outside a transmission signal pass band." Thus, in some embodiments, the test signal can be generated and processed using the same circuitry as for communication signals. In Schwartz, the test signal is always necessarily expressly generated and detected by separate circuitry.

Claims 13 and 24 were rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz in view of U.S. Patent No. 5,754,560 of Nousiainen et al. ("Nousiainen"). The Office Action states that Schwartz teaches all of the elements of the invention except for a switch connected between the between the TX coupling and the RX coupling. The Office Action supplies Nousiainen to remedy this deficiency.

Claim 13 is directed to a method for testing the radio transceiver in a system where the transmission signal pass band, limited by the transmission branch filter of a duplex filter, and the reception signal pass band, limited by the reception branch filter, are adjacent such that the frequency response curves of said filters partially overlap at the stop band between the pass bands. The method includes arranging a test loop between the transmission branch and the reception branch, wherein the test loop includes a TX coupling, a switch, and a RX coupling, the test loop having essentially less attenuation on the test frequency than the duplex filter and thus a test signal proceeds via the test loop from the transmitter to the receiver when the switch having been closed by a switch control. The method also includes adjusting a transmitter local oscillator of the transmitter for tuning the transmitter's transmission frequency away from the

transmission signal pass band to a test frequency that falls into the stop band of the transmission branch filter frequency response curve and the reception branch filter frequency response curve. The method further includes adjusting a receiver local oscillator of the receiver for tuning the receiver reception frequency to the test frequency. The method additionally includes transmitting the test signal. The method also includes receiving the test signal which has been attenuated while passing through the test loop.

Claim 24 is directed to a radio transceiver including a transmission branch including a transmitter having a transmitter local oscillator tunable to a test frequency outside a transmission signal pass band. The radio transceiver also includes a reception branch including a receiver having a receiver local oscillator tunable to the test frequency outside a reception signal pass band. The radio transceiver further includes a duplex filter connected to the transmission branch and the reception branch, the duplex filter limiting the transmission signal pass band and the reception signal pass band. The radio transceiver additionally includes a test loop connected between the transmission branch and the reception branch and including a TX coupling, a band pass filter and a RX coupling, the test loop causing on the test frequency an attenuation essentially lower than the attenuation caused by the duplex filter, enabling a test signal on the test frequency to proceed along the test loop from the transmitter to the receiver, and on the transmission signal pass band and the reception signal pass band an attenuation essentially higher than the attenuation caused by the duplex filter, enabling a signal on the transmission signal pass band to proceed from the transmitter to the duplex filter and on to an antenna. The

radio transceiver is configured to adjust the transmitter local oscillator and the receiver local oscillator on the same test frequency and to cause the transmitter to send the test signal.

As discussed above, certain embodiments have various advantages, such as reducing the amount of test circuitry required. It is respectfully submitted that the cited art of Schwartz and Nousiainen, when viewed singly or combined, fails to teach all of the elements of any of the presently pending claims. Therefore the prior art fails to provide the critical and unobvious advantages discussed above.

Schwartz is discussed above. Nousiainen is directed to a method and apparatus for establishing a test loop for monitoring the operation of a radio station. Nousiainen provides advantageous and reliable loop equipment for monitoring the condition of the radio station including at least two antennas. Nousiainen suggests that for testing purposes a transmit signal in a transmit path from one antenna be switched to a receive path for the other antenna.

Claims 13 and 24 respectively recite, in part, "adjusting a transmitter local oscillator of the transmitter for tuning the transmitter's transmission frequency away from the transmission signal pass band to a test frequency that falls into the stop band of the transmission branch filter frequency response curve and the reception branch filter frequency response curve," and "a transmission branch including a transmitter having a transmitter local oscillator tunable to a test frequency outside a transmission signal pass

band." Schwartz does not teach these elements based on the explanation provided above with regard to claims 12 and 23. Nousiainen does not remedy Schwartz's deficiencies.

In particular Nousiainen does not teach or suggest either "adjusting a transmitter local oscillator of the transmitter for tuning the transmitter's transmission frequency away from the transmission signal pass band to a test frequency that falls into the stop band of the transmission branch filter frequency response curve and the reception branch filter frequency response curve," or "a transmission branch including a transmitter having a transmitter local oscillator tunable to a test frequency outside a transmission signal pass band." Nousiainen's testing system does not adjust a transmitter local oscillator to tune the transmitter's frequency away from the transmission signal pass band. Accordingly, Nousiainen cannot remedy the deficiencies of Schwartz. Thus, Schwartz and Nousiainen, whether taken singly or combined, do not teach or suggest all of the elements of any of the presently pending claims.

Additionally, because Schwartz relates to a method of testing involving a frequency that leaks into the downlink path, and Nousiainen relates to an opposing method in which a transmit from one antenna is switched to the receive of another antenna, it would not have been obvious to combine the two contrary embodiments. Indeed, it is unclear how Schwartz and Nousiainen could be combined. If this rejection is to be maintained, it is respectfully requested that the Office Action contain an explanation of how Schwartz and Nousiainen could be combined without fundamentally altering one or the other, or both.

Claims 14, 16-19, and 21-22 were rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz in view of U.S. Patent No. 5,521,904 of Eriksson et al. ("Eriksson"). The Office Action states that Schwartz teaches all of the elements of the claim except "several transmitters sending transmission signals that are combined into a summed signal by a combiner," and "test control for tuning the transmitter and receiver on the same test frequency." The Office Action cites Eriksson to remedy these deficiencies. Applicants respectfully submit that the claims recite subject matter that is neither disclosed nor suggested in the cited art.

Claim 14, upon which claims 16-18 depend, is directed to a method for testing a unit comprising several radio transceivers in a system where the transmission signals are combined by a combiner into a sum signal and transmitted to the duplex filter, and the received sum signal containing various frequencies is routed from the duplex filter to a divider that splits the signal containing different frequencies to be delivered to its receiver. Also, in the system, the pass band for the system transmission signal frequencies limited by the duplex filer transmission branch filter and the pass band for the system reception signal frequencies limited by the duplex filter reception branch filter are adjacent so that the filter frequency response curves partially overlap at the stop band between the pass bands. The method includes arranging a test loop between the transmission branch and the reception branch, wherein the test loop includes a TX coupling, a band pass filter, and a RX coupling, the test loop having essentially less attenuation on the test frequency than the duplex filter and thus a test signal proceeds via

the test loop from the transmitter to the receiver. The method also includes adjusting a transmitter local oscillator of the transmitter for tuning the transmitter's transmission frequency away from the transmission signal pass band to a test frequency that falls into the stop band of the transmission branch filter frequency response curve and the reception branch filter frequency response curve. The method further includes adjusting a receiver local oscillator of the receiver for tuning the receiver reception frequency to the test frequency. The method additionally includes transmitting the test signal. The method also includes receiving the test signal which has been attenuated while passing through the test loop.

Claim 19, upon which claims 21-22 depend, is directed to a system for testing the radio transceiver. The system includes a transmission branch consisting of a functionally inter-connected transmitter and duplex filter and a reception branch consisting of a functionally interconnected receiver and duplex filter, with the duplex filter limiting the a transmission signal pass band and the a reception signal pass band, the transmitter having a transmitter local oscillator and the receiver having a receiver local oscillator. The system also includes a test control tuning the transmitter local oscillator and the receiver local oscillator on the same test frequency as response to control and the transmitter sending a test signal. The system further includes a test loop connected between the transmission branch and reception branch and including a TX coupling, a band pass filter and a RX coupling, the test loop causing an attenuation on the test frequency that is essentially lower than the attenuation caused by the duplex filter, which enables the test

signal to proceed along the test loop from the transmitter to the receiver, and an attenuation on the transmission signal pass band and the reception signal pass band limited by the duplex filter essentially higher than the attenuation caused by the duplex filter, which enables the transmission signal to proceed from the transmitter to the duplex filter and on to an antenna.

As discussed above, certain embodiments have various advantages, such as reducing the amount of test circuitry required. It is respectfully submitted that the cited art of Schwartz and Eriksson, when viewed singly or combined, fails to teach all of the elements of any of the presently pending claims. Therefore the prior art fails to provide the critical and unobvious advantages discussed above.

Schwartz is discussed above. Eriksson is directed to a method and apparatus for testing a base station in a time division multiple access radio communication system. The radio frequency test loop includes a circuit for transposing the frequency of the carrier signal from the transmitter to a frequency that can be received by the receiver.

Claims 14 and 19 respectively recite, in part, "adjusting a transmitter local oscillator of the transmitter for tuning the transmitter's transmission frequency away from the transmission signal pass band to a test frequency that falls into the stop band of the transmission branch filter frequency response curve and the reception branch filter frequency response curve," and "a test control tuning the transmitter local oscillator and the receiver local oscillator on the same test frequency as response to control and the transmitter sending a test signal." Schwartz does not teach these elements based on the

explanation provided above with regard to claims 12 and 23. Eriksson does not remedy Schwartz's deficiencies.

In particular, Eriksson does not teach or suggest "adjusting a transmitter local oscillator of the transmitter for tuning the transmitter's transmission frequency away from the transmission signal pass band to a test frequency that falls into the stop band of the transmission branch filter frequency response curve and the reception branch filter frequency response curve," and "a test control tuning the transmitter local oscillator and the receiver local oscillator on the same test frequency as response to control and the transmitter sending a test signal." As explained above, Eriksson uses a very different way to create a test loop, namely by transposing the frequency of the carrier signal from the transmitter to a frequency that can be received by the receiver. Therefore the cited art of Schwartz and Eriksson, whether viewed singly or in combination, does not teach all of the elements of any of the presently pending claims.

Additionally, one of ordinary skill in the art would not have been motivated to combine Schwartz and Eriksson. As described above, Schwartz tests using the non-idealities of the duplex filter to use a test frequency that is between the transmission and reception frequencies. Eriksson, in contrast, transposes the carrier frequency of a transmit signal so that it can be received by a receive channel. If this rejection is maintained, it is respectfully requested that the Office Action contain an explanation of how it would have been possible to combine Schwartz and Eriksson without fundamentally altering one or the other or both.

Dependent claims 16-18 and 21-22 contain all the limitations of claims 14 and 19 respectively, as well as additional limitations, and are therefore patentable for at least the reasons that claims 14 and 19 are patentable.

Claim 15 was rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz in view of Eriksson (as applied to claim 14) and further in view of Nousiainen. The Office Action takes the position that Schwartz and Eriksson teach all the elements of claim 15 except "a switch connected between the transmitters and receivers." The Office Action cites Nousiainen to remedy this deficiency. Applicants respectfully submit that the claims recite subject matter that is neither disclosed nor suggested in the cited art.

Claim 15 is directed to a method for testing a unit comprising several radio transceivers in a system where the transmission signals are combined by a combiner into a sum signal and transmitted to the duplex filter, and the received sum signal containing various frequencies is routed from the duplex filter to a divider that splits the signal containing different frequencies to be delivered to its receiver, the pass band for the system transmission signal frequencies limited by the duplex filer transmission branch filter and the pass band for the system reception signal frequencies limited by the duplex filter reception branch filter are adjacent so that the filter frequency response partially overlap curves at the stop band between the pass bands. The method includes arranging a test loop between the transmission branch and the reception branch, wherein the test loop includes a TX coupling, a switch, and a RX coupling, the test loop having essentially less attenuation on the test frequency than the duplex filter and thus a test signal proceeds via

the test loop from the transmitter to the receiver when the switch having been closed by a switch control. The method also includes adjusting a transmitter local oscillator of the transmitter for tuning the transmitter's transmission frequency away from the transmission signal pass band to a test frequency that falls into the stop band of the transmission branch filter frequency response curve and the reception branch filter frequency response curve. The method further includes adjusting a receiver local oscillator of the transmitter for tuning the receiver reception frequency to the test frequency. The method additionally includes transmitting the test signal. The method also includes receiving the test signal which has been attenuated while passing through the test loop.

As discussed above, certain embodiments have various advantages, such as reducing the amount of test circuitry required. It is respectfully submitted that the cited art of Schwartz, Nousiainen, and Eriksson, when viewed singly or combined, fails to teach all of the elements of any of the presently pending claims. Therefore the prior art fails to provide the critical and unobvious advantages discussed above.

Claim 15 recites, in part, "adjusting a transmitter local oscillator of the transmitter for tuning the transmitter's transmission frequency away from the transmission signal pass band to a test frequency that falls into the stop band of the transmission branch filter frequency response curve and the reception branch filter frequency response curve." Based on the same reasoning, as explained above, with regard to each of the various rejections, Schwartz, Nousiainen, and Eriksson do not teach or suggest at least this

element. Therefore, claim 15 is patentable over Schwartz, Nousiainen, and Eriksson based on at least that element.

Additionally, one of ordinary skill in the art would not have been motivated to combine Schwartz, Nousiainen, and Eriksson. As explained above with regard to the combination of Schwartz and Nousiainen and of Schwartz and Eriksson, Schwartz, Nousiainen, and Eriksson each describe fundamentally different testing methods. If this rejection is maintained, it is respectfully requested that the Office Action contain an explanation as to how it would have been possible to combine Schwartz, Nousiainen, and Eriksson without fundamentally altering at least two of the references.

Claims 20 was rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz in view of Nousiainen (as applied to claim 13 above), and further in view of Eriksson. The Office Action states that Schwartz and Nousiainen teach all the elements of claim 20 except "a test control for tuning the transmitter and the receiver on the same test frequency." The Office Action supplies Eriksson to remedy these deficiencies. Applicants respectfully submit that the claims recite subject matter that is neither disclosed nor suggested in the cited art.

Claim 20 is directed to a system for testing a radio transceiver. The system includes a transmission branch consisting of a functionally interconnected transmitter and a duplex filter and a reception branch consisting of a functionally interconnected receiver and the duplex filter, with the duplex filter limiting a transmission signal pass band and a reception signal pass band, the transmitter having a transmitter local oscillator and the

receiver having a receiver local oscillator. The system also includes a test control tuning the transmitter local oscillator and the receiver local oscillator on the same test frequency as response to control and the transmitter sending a test signal. The system further includes a test loop connected between the transmission branch and reception branch and includes a TX coupling, a switch and a RX coupling, the test loop with the switch closed causing an attenuation on the test frequency that is essentially lower than the attenuation caused by the duplex filter enabling the test signal to proceed along the test loop from the transmitter to the receiver and the test loop with the switch open causing an attenuation on the transmission signal pass band and the reception signal pass band limited by the duplex filter being essentially higher than the attenuation caused by the duplex filter enabling the transmission signal to proceed from the transmitter to the duplex filter and on to an antenna.

As discussed above, certain embodiments have various advantages, such as reducing the amount of test circuitry required. It is respectfully submitted that the cited art of Schwartz, Nousiainen, and Eriksson, when viewed singly or combined, fails to teach all of the elements of any of the presently pending claims. Therefore the prior art fails to provide the critical and unobvious advantages discussed above.

Claim 20 recites, in part, "a test control tuning the transmitter local oscillator and the receiver local oscillator on the same test frequency as response to control and the transmitter sending a test signal." Based on the same reasoning as explained above with

regard to claim 15, Schwartz, Nousiainen, and Eriksson fail to teach or suggest at least this element of the claim.

Additionally, as discussed above, one of ordinary skill in the art would not have been motivated to combine Schwartz, Nousiainen, and Eriksson, because Schwartz, Nousiainen, and Eriksson each describe fundamentally different testing methods. If this rejection is maintained, it is respectfully requested that the Office Action contain an explanation as to how it would have been possible to combine Schwartz, Nousiainen, and Eriksson without fundamentally altering at least two of the references.

Conclusion

For the reasons described above, it is respectfully submitted that each of claims 12-24 recite subject matter that is neither disclosed nor suggested in the cited art. It is therefore respectfully requested that all of claims 12-24 be allowed, and that this application be passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

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